

Patent Claims

Sb 1. A device (5) for a rail vehicle having

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- a control unit (10), which
- determines the distance between the rail vehicle and the respective intended next stop using a measured location measured value (S), which indicates the location of the rail vehicle, and predetermined, stored route data,
- determines the remaining traveling time to the next stop using a measured time measured value (t), which indicates the respective time, and a predetermined, stored timetable, and
- forms a recommended drive switching-off time (tab,nom) taking account of the determined distance, of the determined remaining traveling time, of a speed measured value (v) which indicates the speed of the rail vehicle, and predetermined coasting data (AD), which describes the coasting behavior of the rail vehicle when the drive is switched off, from which drive switching-off time (tab,nom) the rail vehicle will reach the intended next stop on time in accordance with the respective timetable without being driven, and
- having an output device (30) which is connected to the control unit (10) and is driven by it, and which produces a switching-off signal which indicates the recommended drive switching-off time (tab,nom),

characterized

- in that the device (5) has a data input (E5) at which an actual value signal (Si) which indicates the actual drive switching-off time (tab,act) can be entered in the device (5), with the actual drive switching-off time (tab,act) indicating that time at which

the drive was actually switched off after the switching-off signal was produced, and

- in that the control unit (10) has a memory in which

5 - it stores the actual drive switching-off time and the respectively associated, recommended drive switching-off time (tab,act; tab,nom), for evaluation.

10 2. The device as claimed in claim 1, characterized in that

- the control unit (10) is designed such that it
 - forms a time difference value by forming the difference between the actual drive switching-off time and the respectively associated recommended drive switching-off time (tab,act; tab,nom).

15 3. The device as claimed in claim 2, characterized in that

- the control unit (10) has an output (A10) and is designed such that it
 - produces a warning signal (WS) at its output when the time difference value exceeds a predetermined threshold value.

20 4. The device as claimed in claim 2 or 3, characterized in that

- the control unit (1) is designed such that it
 - forms a delay value using at least the respectively most recently formed time difference value, and
 - determines the respectively most recent recommended drive switching-off time furthermore taking into account this delay value which has been formed.

25 35 5. The device as claimed in claim 4,

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characterized in that

- the control unit (1) is designed such that it
 - first of all calculates an auxiliary switching-off time, taking account of the determined distance, the determined remaining traveling time, the speed measured value (V) which indicates the speed of the rail vehicle, and predetermined coasting data (AD), which describes the coasting behavior of the rail vehicle when the drive is switched off, from which auxiliary switching-off time the rail vehicle will reach the intended next stop on time in accordance with the respective timetable without being driven, and then
 - forms the difference between the auxiliary switching-off time and the delay value to determine an advanced drive switching-off time, and treats the advanced drive switching-off time as the recommended drive switching-off time.

6. The device as claimed in one of the preceding claims,

characterized in that

- the control unit (10) is designed such that it determines the recommended drive switching-off time by additionally taking into account a predetermined braking profile and a predetermined minimum speed which, if undershot, would result in the rail vehicle being braked in accordance with the predetermined braking profile in the phase when it is approaching the next stop without being driven.

35 7. A method for producing a switching-off signal, in which

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- a measured location measured value (S), which indicates the location of a rail vehicle, and predetermined, stored route data are used to determine the distance between the rail

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predetermined, stored route data are used to
determine the distance between the rail

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characterized in that

- the control unit (1) is designed such that it
 - first of all calculates an auxiliary switching-off time, taking account of the determined distance, the determined remaining traveling time, a speed measured value (V) which indicates the speed of the rail vehicle, and predetermined coasting data (AD), which describes the coasting behavior of the rail vehicle when the drive is switched off, from which auxiliary switching-off time the rail vehicle will reach the intended next stop on time in accordance with the respective timetable without being driven, and then
 - forms the difference between the auxiliary switching-off time and the delay value to determine an advanced drive switching-off time, and treats the advanced drive switching-off time as the recommended drive switching-off time.

6. The device as claimed in one of the preceding claims,

characterized in that

- the control unit (10) is designed such that it determines the recommended drive switching-off time by additionally taking into account a predetermined braking profile and a predetermined minimum speed which, if undershot, would result in the rail vehicle being braked in accordance with the predetermined braking profile in the phase when it is approaching the next stop without being driven.

35 7. A method for producing a switching-off signal, in which

- a measured location measured value (S), which indicates the location of the rail vehicle, and

vehicle and the respectively intended next stop,

5 - a measured time measured value (t), which indicates the respective time, and a predetermined, stored timetable are used to determine the remaining traveling time to the next stop, and

10 - taking account of the determined distance, the determined remaining traveling time, a speed measured value (V) which indicates the speed of the rail vehicle, and predetermined coasting data (AD), which describes the coasting behavior of the rail vehicle when the drive is switched off, a recommended drive switching-off time ($t_{ab,nom}$) is formed, from which the rail vehicle will reach the intended next stop on time in accordance with the respective timetable without being driven, and

15 - a signal which indicates the recommended drive switching-off time is produced as the switching-off signal,

20 characterized in that

25 - the actual drive switching-off time is determined at which the drive was actually switched off after production of the switching-off signal, and

30 - a time difference value is in each case formed by forming the difference between the actual drive switching-off time and the respective recommended drive switching-off time ($t_{ab,act}; t_{ab,nom}$).

8. The method as claimed in claim 7,
characterized in that

35 - a warning signal is produced if the time difference value exceeds a predetermined threshold value.

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9. The method as claimed in claim 7 or 8,
characterized in that

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- a delay value is formed using at least the respective most recently formed time difference value, and
- the respective most recent recommended drive switching-off time is determined furthermore taking into account this delay value which has been formed.

10. The method as claimed in claim 9,
characterized in that

- taking account of the determined distance, the determined remaining traveling time, a speed measured value (V) which indicates the speed of the rail vehicle, and predetermined coasting data (AD), which describes the coasting behavior of the rail vehicle when the drive is switched off, an auxiliary switching-off time is first of all calculated from which the rail vehicle will reach the intended next stop on time in accordance with the respective timetable without being driven, and then
- by forming the difference between the auxiliary switching-off time and the delay value, an advanced drive switching-off time is determined, and the advanced drive switching-off time is treated as the respective most recent recommended drive switching-off time.

30. The method as claimed in one of the preceding claims 7 to 10,
characterized in that

- the recommended drive switching-off time is determined by additionally taking into account a predetermined braking profile and a predetermined minimum speed which, if undershot, would result in the rail vehicle being braked in accordance with the predetermined braking

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profile in the phase when it is approaching the
next stop without being driven.

12. An arrangement having a device (5) as claimed in one of claims 1 to 6 and having an evaluation device which is connected to a data output (D10) of the device (5),

5 - which evaluation device reads from the device (5) data signals which indicate the stored actual drive switching-off time and the respective associated, recommended drive switching-off time (tab,act; tab,nom), and

10 - forms a time difference value by forming the difference between the actual drive switching-off time and the associated recommended drive switching-off time (tab,act; tab,nom).

15 13. The arrangement as claimed in claim 12, characterized in that

 - the evaluation device is an evaluation device on the track side.